Williams: Planned and Unplanned Changes in the Marginal Lands of South Australia

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Summary: A major scheme for restructuring the rural landscape was implemented in the drought and erosion prone margins of wheat cultivation in South Australia between 1939 and 1961. It was a planned abandonment of farms by halving the number of holdings and doubling the size of the remainder. The origins and working of the Marginal Lands Scheme are examined and an appraisal made of its geographical impact on the Murray Mallee region of South Australia. Since 1961 farm enlargement by voluntary unplanned aggregation of holdings and scattered blocks has accelerated. Further enlargement is needed to satisfy new concepts of an adequate ‘home maintenance area’. The inertia of rural planning is underlined by these changes.

Introduction

Australia offers some striking examples of schemes to remodel the rural landscape, by altering the fields, farm sizes, farm houses and land use, which are comparable in their extent and complexity to schemes in many European countries. Currently there is the Reconstruction of the Dairy Industry, but before that and since 1941 it has been official policy to assist the outmigration of farmers from the drought-affected margins of the wheat growing areas of Australia (and of South Australia in particular) by purchasing the smallest holdings and adding them to neighbouring holdings.

The abandonment of the rural holdings has been planned carefully in order to promote a new level of stability for the family farm at a larger size than before. The Marginal Lands Scheme, as it is called, is now officially over, nevertheless its results can now be assessed and its adequacy evaluated in the light of current unplanned trends. This paper sets out to examine the origins, working and future of this reorganization of settlement. Evidence from interviews by farmers throws light on their response to current events and their attitudes towards future change. Attention is focused on the Murray Mallee region of South Australia where the most reorganization took place within the State.

10. *A Community Health Program for Australia*; op. cit., pp. 5.

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ORIGINAL OCCUPATION, 1880-1937

The Marginal Lands of South Australia were settled by wheat farmers in two major thrusts, different in their timing but similar in their buoyant optimism and melancholy results (Figure 1).

After 1869 new and liberal land laws allowed the purchase of land on credit instead of for cash and this loosened a boom of settlement in the Northern Areas. Spurred on by slightly higher than average rainfall and good returns, wheat farmers pushed north and east of the ranges and plains of the Northern Areas to the very edge of the semi-arid interior of South Australia, beyond the 300 mm isohyet. This phase resulted in a disaster when the precipitation returned to 'normal', after 1880 drought prevailed, causing hardship throughout the region, but particularly to those on the very edges of the settled areas.4

G. W. Goyder, the Surveyor-General, attempted to map the extent of a severe drought in 1865. Goyder's Line, as it became known, was a base line against which the 'safe' and the 'unsafe' agricultural areas were measured, particularly after the experience of the 1880s,5 and it has a considerable validity even today, but it was clear at the time that the 'line' was not a

Figure 1: South Australia, zones of settlement and the Marginal Lands. Source: S.A. Dept of Lands
fixed line but 'a strip of debatable ground' which could be occupied during favourable seasons, but which yielded nothing in other years:

Outside this belt of forty or fifty miles in width the settler got beyond the influence of the coast rains, and the rainfall was then so thoroughly unreliable that no one could depend in the slightest degree on successfully cultivating the ground.6

In fact, settlers did struggle on in this 'debatable ground' for at least another thirty years, as it was not until the census of 1910 that a marked decline of population could be observed in these fringe areas.

The second major thrust of settlement came after the prolonged depression of the 1880s and 1890s.7 During the early years of the present century the State government took the lead in encouraging rural settlement by building railways ahead of settlers, boring wells, and providing land on liberal terms, mainly by perpetual leases at a very low rental, which offered long-term security, and allowed the settlers some latitude during times of financial hardship during drought and/or low prices. The new wave of settlement began with the construction of the railway line to Pinnaroo in the Murray Mallee in 1906. During the next sixteen years a network of lines was laid through the Mallee region and Eyre Peninsula so that no settler was more than 15 km (10 miles) from a means of transport, be it coast, River Murray, or a railway. These two regions were neglected for so long because they were inaccessible from the main core around Adelaide. Their dense scrub eucalypt 'mallee' vegetation which had also been a major barrier to occupation was overcome by the widespread adoption of locally invented machinery for rolling down the scrub, and by the use of the stump-jump plough whose hinged shares lifted over the large bulbous mallee roots left in the ground after the stems had been rolled down. The widespread utilization of superphosphate fertilizers, better strains of wheat, active governmental encouragement to expand, and an unshakable faith in falling to conserve moisture and increase yields resulted in a repetition of the experience of nearly forty years before in the Northern Areas. Many farmers went too far inland into climatically variable lands, and the result was disastrous.

The lessons of the 1880s should have been a warning to settlers and government alike of the folly of the northward thrust into the Murray Mallee and Eyre Peninsula during the 1920s, but South Australia, like other parts of Australia, was in a vigorous expansionist mood which seemed as 'inevitable' as it seemed 'essential'. South Australia still had a rural-based economy, and the Director of Agriculture summed up popular attitudes when he said 'increased production we must have, and if we cannot get it from the soil where can it possibly come?'8 The result was the extension of farming into less productive lands and the gradual build-up of grain surpluses. The effects of the world wheat glut and the collapse of prices in 1929 were disastrous, but the Commonwealth (Federal) government stimulated expansion with a guaranteed price of forty cents per bushel and the greatest wheat acreage ever was planted during the 1930 season.9

During the 1930s these areas also experienced drought. Drought in the marginal areas was regarded as a normal condition which was to be dealt with piecemeal, and drought relief payments between 1914 and 1929 totalled $4,080,642 of which $2,473,600 was never repaid, particularly after the 1926 drought. The major part of this relief money (between 76 and 93 per cent) went consistently to the same three areas: the Murray Mallee, northern Eyre Peninsula, and the northern portion of the Northern Areas.

In 1931 an Agricultural and Settlement Committee appointed to consider the rural situation in South Australia concluded that drought relief had become so costly that it could not continue. The Committee recognized a fluctuating 'margin of cultivation' whose position depended on a combination of price levels for wheat, production costs, and seasonal circumstances. The margin of cultivation expanded into drier and less fertile country when the price for wheat was high. It receded when prices fell or production costs rose. The Committee recommended that crop insurance be compulsory and that surplus farmers be transferred to more prosperous districts. This latter suggestion ran counter to the whole expansionist ethos of the time, but the 1931 Report led to an appreciation of the nature of the situation.10

Conditions continued to get worse during the early 1930s. Four-fifths of the 13,451 wheat producers in the State averaged 539 kg/ha (7.93 bushels per acre) between 1925 and 1934 and had a mean return of $A1.83 per acre, well below the minimum return of $A4.00 per acre, and 1,634 farmers (12 per cent) had a mean yield of only 93 kg/ha (1.37 bushels per acre).11 Officials castigated the farmers for 'faulty or slovenly farming practices', particularly too little fallowing to increase soil moisture retention and nitrogen release. As a result the amount of wheat grown on fallowed land increased in the Murray Mallee from one-third in 1930/1 to three-quarters in 1934/5, and on Eyre Peninsula it went from one-quarter to two-fifths. The ever-present problem of soil drift in the loose sandy soils of both regions was immediately accelerated and considerably worsened the position of the struggling farmers.12

In 1935, for the first time, the Director of Agriculture mapped wheat yields by hundreds (cadastral and statistical units) for the period 1914/15 to 1934/5. Every hundred beyond Goyder's Line had an average yield below 816 kg/ha (12 bushels per acre), which was considered a good yield, and most were below 408 kg/ha (6 bushels per acre). The publication and widespread distribution of this map resulted in the listing of 'typically unsuitable wheat growing hundreds
in which wheat growing could not by any standards of
imagination, then or in the future, be a paying proposi-
tion', and in which farmers should be assisted in
making a permanent change to sheep grazing. The
Director of Agriculture's solution was for the creation of:

farms upon which sheep husbandry would be prac-
tised on relatively small areas . . . Crops would still
have to be raised but not for sale, but for the con-
sumption by livestock. I have suggested a flock of
600 ewes: and I realized that some of the properties
in question are not sufficiently large for the purposes.
This would simply mean the necessity of merging
two or more farms into one, and the transference of
some families to other districts.13

In 1937 younger farmers who appreciated the degree
to which their activity was 'sub marginal' had already
begun a selective migration that has continued ever
since.

THE MARGINAL LANDS SCHEME, 1938-63

By halting stages official attitudes changed and the
concept of the Marginal Lands became established. In
1938 the Federal government and State premiers agreed
that $1,000,000 of a newly imposed flour tax should be
used to rehabilitate the marginal areas, a task which in
South Australia was assigned to the Marginal Lands
Committee in 1939. The Committee combined loca-
tional, climatic, and economic concepts in the first
formal description of Marginal Lands as 'areas which
have been subdivided into blocks intended principally
for wheat growing and which have been utilized mainly
for that purpose but owing to the combination of an
inadequate rainfall and unsuitable land have proved
unsuitable for wheat as a major operation'.14 Wheat
cropping had to be reduced to a part of a rotation
with pasture cropping so that the soil could be rested
and fertility restored, and a reserve of fodder be made
available during any drought. The Northern Areas were
so 'utterly spoilt' by intensive cultivation and erosion
that it was recommended that these lands should revert
entirely to pasture.

The Committee estimated that there were 2,708,381
ha (6,692,550 acres) of marginal land in South Aus-
tralia, but as much of the land was already in holdings
large enough for mixed farming operations only
682,942 ha (1,695,000 acres) were to be restructured,
222,577 ha (550,000 acres) on Eyre Peninsula,
110,074 ha (272,000 acres) in the Northern Areas,
84,579 ha (209,000 acres) in the Murray Plains, and
268,311 ha (664,000 acres) in the Murray Mallee,
although, in fact, in every region the restructuring
seemed so beneficial that nearly double these amounts
were eventually affected.

The purchase of rural sections from farmers who
were willing to sell or transfer began in earnest in 1940.
Over 65 per cent of all repurchases and redistributions
occurred during the years of World War II when the
rural workforce was being radically reorganized and
reduced, and machinery being introduced, and nearly
all purchases were complete by 1960. The guiding
principle in this planned reorganization was the concept
of an 'adequate living area' which would 'ensure the
conservation of soil fertility and preserve family life
under just conditions'. Implicit was the idea that the
farmer should be able to withstand the enormous
income fluctuations of his marginal drought-prone
location (Figure 2), meet all legitimate expenses, and
leave himself enough at least to equal the wages of a
casual labourer in the Adelaide urban area on the
federally adjusted basic wage. In 1946 the basic wage
of $A530 per annum had been exceeded only during the
previous decade by the average Marginal Lands
farmer operating a 1,214 ha (3,000 acres) mixed
property in the sandy Murray Mallee ($A688) and
Eyre Peninsula ($A656) and those in the stony Mallee
and Plains averaged $A468; in the Upper North Areas
$A496; and the westernmost Eyre Peninsula between
$A358 and $A382.15

Direct subsidies were rejected, although indirect
subsidies in the form of drought relief and debt write-
offs continued unabated to 1945. The new aim was the
basic reconstruction of the farm to an economic size.
In areas of better soils it was calculated that 200-250
ha (500-600 acres) of wheat could be grown every five
years on some part of the holding without detriment to
soil fertility and structure, giving a holding of between 1,000 and 1,200 ha (2,500 and 3,000 acres).

Wheat cultivation had to be reduced drastically and sheep rearing increased. The implications for community life and small town prosperity of the decrease in cultivation accompanying farm enlargement were feared but were regarded as inevitable. Freehold tenures were extinguished and the reorganized land held under perpetual leases by the State government, which had the right of eviction if the conditions of occupation were not met.

Throughout the Marginal Lands the distribution of purchases was irregular and spotty because only about every other holding was repurchased and added to a neighbouring one. In each of the three main regions of restructuring activity, the Murray Mallee, the Northern Areas and Eyre Peninsula (Figure 1), the detail of the distribution of the purchases was affected by soil conditions and existing holding sizes; purchasing being greater where the soil was of poor quality, and/or subject to erosion, and where holdings were small. For example, in the Murray Mallee (Figure 3) about 600 Marginal Lands Perpetual Leases (MLPL) covering 418,586 ha (1,034,326 acres) were issued. Their outer limits were defined by the pastoral areas to the north which were unsafe for cultivation, roughly beyond the

Figure 3: The areas affected by Marginal Lands Perpetual Leases (MLPL) in the Murray Mallee region. Source: S.A. Lands Dept Files
230 mm isohyet and the safe 'agricultural' areas to the south where the average annual rainfall is in excess of 350 mm. The southwest, southeast and northeast quadrants of the region were designated as 'Sandy Mallee' by the Marginal Lands Committee and its boundaries were drawn along cadastral lines. There were areas of predominantly calcareous sands and brown earths traversed by east-west dunes up to 6 m (20 feet) high, all

![Figure 4: Holdings in the Marginal Lands in the northeast Murray Mallee in 1939 and the effect of the scheme on dwellings. Source: Field interviews](image-url)
of which had experienced serious drift and erosion. This area underwent the greatest farm reorganization. To the east of Loxton the local occurrence of clay subsoil made the soils more moisture-retentive and alleviated some of the worst effects of low rainfall amounts and sandiness, hence there was less reorganization there. In the extreme south of the southeast quadrant the soils were yellow mottled, alkaline sands which were so impoverished and eroded that much of the land was completely abandoned and was subsequently declared the Wild Life Reserves of Billiat and Peebinga. South again, beyond the reserves and towards Pinnaroo and Lameroo, the soil quality improved markedly with many firm brown loam pockets.

The northwest quadrant consisted of calcareous sands and loams similar to the rest of the Mallee but with a great admixture of limestone nodules and it was consequently designated the 'Stony Mallee'. Here reorganization was confined mainly to the sandiest soils. The same sort of land occurred on the western side of the River Murray in the Murray Plains Region.

In both Sandy and the Stony Mallee the amount of redistribution was less nearer to the River Murray because this land had been settled first and greater areas of the mallee vegetation had been cleared and hence made productive leading to the creation of larger and more economically viable holdings. In addition, much of the land was purchased early on freehold tenure which inhibited surrender by the owner and easy purchase by the government.

THE CHANGING GEOGRAPHY, 1939-74

No summary statistics exist of the changes wrought in the landscape by the Marginal Lands Scheme, but it would be safe to say that in all regions the number of holdings has halved since 1939, their size has at least doubled, and hence the population has declined by about 50 per cent. In order to test these assertions and to evaluate the future of the Marginal Lands a detailed survey and interview was made of the six hundreds covering approximately 296,000 ha (1,146 sq. miles) in the northeast quadrant of the Murray Mallee, an area which had received extensive reorganization in the south and less in the north, which seemed fairly typical of the range and scale of changes elsewhere in marginal areas in South Australia.

Figure 4 shows that distribution of holdings on the eve of the implementation of the scheme in 1939/40 and is based on the evidence of the local Rate Books. There were 513 compact holdings, many too small to be shown on the map, and two fragmented holdings with detached portions. As far as can be ascertained there was an equal number of farm dwellings, one to each holding. The average size of the holdings was 501.8 ha (1,234 acres). This simple, traditional arrangement was disrupted by the issuing of 184 MLPL, some covering more than one holding (shaded area on Figure 4) so that by 1949/50 only 292 holdings remained in the area, excluding the new irrigation holdings alongside the River Murray in the Hundreds of Pyap and Gordon. The average size of the holdings rose to 1,025.5 ha (2,534 acres).

The distribution of abandoned houses (and to a lesser extent of ruins) is a measure of this reorganization. There were eighty-three abandoned stone-built houses which were in a fairly good state of repair because when the land was resumed under MLPL so were all the improvements (wells, cleared land, houses) and the new lessees were obliged to maintain them. However, a house with a roof is taxable even though it has stood empty for thirty years, and there have been many strange fires and roof structure failures in the Mallee. Gradually farmers are getting permission to demolish redundant houses. Some of the 100-odd ruins may be an indication of abandoning during this period but many must have been the result of abandonment before the Marginal Lands Scheme came into operation.

Figure 5 depicts the same area again late in 1971 and it shows holding boundaries, occupied houses, and ownership and operational links. Since the last new MLPL was issued in 1961, and even before that, more changes have gone on, but this time of a voluntary nature so that the number of holdings has fallen from 292 in 1949/50 to 194 and their average size has increased even further than under the Marginal Lands Scheme to 1,405 ha (3,472 acres). The policy of attempting to create compact family farmed holdings at a new scale by the amalgamation of neighbouring properties each with its own farm house within its own farm boundary has been replaced by a fragmentation of operation and ownership as farmers have attempted to continue previous processes of enlargement wherever and whenever land has come onto the market. Of the 194 holdings depicted on Figure 5 only 132 are compact, self-contained, single family units. Thirty-four holdings owned by single families are physically fragmentated, and four holdings are worked from the town of Loxton. Operationally the pattern was even more complex. Nine holdings had two or three houses on them where father and son worked the holding together, although with a death or retirement one of the houses will almost inevitably be abandoned. More complex still were seven cases with a total of fifteen farm houses where father and son or brother and brother operated in some sort of partnership, sharing profits and equipment. In addition to the farm dwellings there were also eighteen non-farm dwellings, the old farm houses of the previous sub-optimal sized farms affected by the MLPL. These were all within reasonable travelling distance of Loxton (pop. 2,663 in 1971) and offered cheap accommodation for old age pensioners, retired farmers, deserted wives with families, and a group of school teachers.
Figure 5: The Marginal Lands in the northeast Murray Mallee, 1971; holdings, ownership and operational links, and occupied dwellings. Source: Field interviews
From this analysis of the contemporary rural scene it is clear that for the Marginal Lands Scheme, as in most other land reform and restructuring schemes, the context of the plan changed more rapidly than the plan itself so that the measures and goals fell far short of the ideal. The stability which the radical once-and-for-all adjustment which the scheme hoped to achieve is already upset by unplanned events, not least of which is periodic rainfall deficiency. The size of the area needed to maintain a farm family in ‘just conditions’ at a level of living regarded as adequate by the standards of the community cannot be static. The 1946 Committee recognized the need for the farmer to earn a minimum living wage and enough for ‘all legitimate expenses’. Therefore, he must have the opportunity to increase his farm size to provide the returns on capital and labour in order to enable the formation of new capital. In a sense the past restructuring under the scheme hinders contemporary change by leaving few small holdings available for amalgamation. Twenty-five of the thirty-three holdings which have detached portions were not dealt with under the Scheme and their owners have been forced to pick up additional blocks of land whenever and wherever they can. However, it must be stressed that non-contiguity may not be a bad thing for some of the more complex fragmented arrangements are the result not only of attempts to minimize income failure by achieving greater size but also of attempts to get a greater scatter in order to achieve diversification of soil type, micro-climate and hence crop risk, a trend which, if taken to its extreme, does not augur well for the traditional concept of the compact family farm.

The alternative to enlargement and/or greater intensification of land use is to get off-farm employment. Twenty-seven of 132 farmers interviewed were doing this in 1971. Some of the jobs were seasonal and could be fitted in with farm operations, others were occasional but some were virtually permanent. The employment was needed for essential income and not for luxuries, and it shows the inadequacy of current farm incomes. The aim of family life ‘under just conditions’ is hardly being met.

The chances that yet further change will occur are great. About half (67) of the 132 farmers interviewed in 1971 were dissatisfied with the size of their holdings and said that the farms could be enlarged and worked efficiently without any additional labour or machinery. The average size of their holdings was 1,329 ha (3,284 acres) and the mean extra land which they thought they could handle was 809 ha (1,998.5 acres). The other half of the farmers were satisfied and the average size of their holdings was 1,895 ha (4,683 acres). There was no spatial variation in the distribution of potential enlargers and non-enlargers; they were represented almost equally in all hundreds. Perhaps more significant was the fact that one-quarter of the potential enlargers had off-farm employment to supplement their income, which underscores their desire and need to enlarge their holdings. The signs are already present that some of these desires are coming to fruition be-

Figure 6: The number and size of holdings in the Hundreds of Bookpurnong, McGorrery, Allen, and Kekwick in the northeast Murray Mallee 1925-73. Source: Australian Bureau of Statistics, Tabulation Books
cause between 1971 and 1974 the number of holdings has dropped by another fourteen, and their average size has risen to 1,469 ha (3,630 acres). A view of the total change in the number and size of holdings from 1925 to 1975 is given in Figure 6. The graph is for the Hundreds of Bookpurnong, Allen, Kekwick, and McGorery which are unaffected by irrigation development. Despite the individual fluctuations for each Hundred, the general trend of enlargement of holdings and abandonment of farms is substantiated in all cases.

**IMPLICATIONS FOR FURTHER RURAL RESTRUCTURING**

The South Australian government’s legislation on Marginal Lands was radical, and it facilitated the change-over from a pioneer to a more ‘natural’ scale of farming. It helped to get rid of a legacy of past policy of an idealized farm population density and mode of occupation, and it was a rational attempt to establish a unified solution to replace piecemeal measures in the past. But despite this impressive beginning, governmental direction has slipped back into governmental palliatives; piecemeal handouts as of old have encouraged more people to stay in the drought-prone Marginal Lands than should. Drought is a ‘psychological soft spot’ and governments and public alike are ready to redeem the struggling farmer.\(^19\) 65 per cent of a Commonwealth grant of $2,400,000 to South Australia being distributed in the Murray Mallee in 1966/7.

With the problems of wheat quotas, low wool prices and declining meat markets overseas since 1969 the Marginal Lands, like other parts of the wheat/sheep belt of Australia, are on the verge of another major, but largely unplanned reorganization. The Commonwealth government has partially recognized the need to assist change in its Rural Reconstruction Programme by which South Australia will receive SA12,000,000 over five years, half for debt readjustment and carry-over finance, and half for ‘farm build up’, i.e. enlargement. But the total amount is small considering the rising costs of rural land and the fact that it applies to the whole of South Australia including the pastoral lands of the interior.\(^20\) Much of the money seems to be going towards the enlargement of the very small (e.g. less than one square mile, 259 ha) holdings created for ex-servicemen in the Lower Southeast and Kangaroo Island, although there are some cases of farm build-up in the Murray Mallee region. But Rural Reconstruction does not go far enough, the measures are merely tinkering with the rural situation, especially when past experience shows that times of emergency are the most propitious times for innovations. In addition, compact farms are insisted upon, an increasingly difficult aim in many areas of the Marginal Lands, particularly when it may not even be desirable and when farmers themselves are not averse to travelling up to about 15 km (10 miles) in order to work extra blocks of land.

The evidence of the attitudes revealed and changes observed in the Murray Mallee suggest that any future reorganization will be more difficult than before as the desirable holding size is now so much larger for the maintenance of commonly held living standards. The need will be to select the smallest existing properties and divide them or add them whole to adjacent ones. Unless the government provides more finance than at present it is likely that climatic and economic marginality exacerbated by inflation will work from time to time and that farmers will be forced to leave at a time of depressed land prices. This would be the ‘voluntary aggregation’ and ‘natural levelling out brought about by adverse seasons’ which was so forcibly rejected as far back as 1931 but which has happened already. The weeding out of inefficient farmers means that those remaining will be survivors and ‘have at least the aura of successful resource managers’.\(^21\) The process will lead to even greater fragmentation than now exists and the fair degree of compactness achieved through the orderly reorganization of the Marginal Lands Scheme in the past is already being replaced by long distances and fragmentation,\(^22\) although this may not be too bad a change, as has been mentioned before.

But how does the family farm reorganize itself to meet new problems? How does it keep up with trends when in rural matters administration always seems to be a couple of decades out of touch, largely because governments adhere to old concepts and old ideals that are deeply embedded in our western culture, and isolate agriculture from the mainstream of socio-economic change when it should be an integral part of urban and regional policies. It is official thinking that is lagging; the indicators of change as revealed in farm numbers and the desires by the rural population for changes show that individuals will react quickly enough to the sorting out process, but, inevitably, at the price of great hardship to some.

The failure to analyse systematically the physical, economic, social, and political forces in the total farm environment has led to our present inability to understand the plight of many farmers. We have maintained an economic system dependent upon the family unit within our western society, in which most other industries are organized on a large scale and in which the house and the producing and consuming factors are not combined in the same unit. In this need for a total geographical overview of a particular rural situation the Marginal Lands Scheme was a brave but increasingly inadequate attempt at a planned solution to the disadvantages of a marginal location. The need is for more adequate forecasting of potential future change in rural areas and the recognition of a variety of options for future action.\(^23\) Rural planning cannot be based upon models of past arrangements, rather we shall have to invent new models and mould our countryside according to them.
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References
5. Goyder’s Line was never surveyed east of the River Murray (see Figure 1). In 1887 the Line was projected south of the Pinnaroo District. The Line was regarded as a firm basis for land evaluation yet the desire to promote new agricultural settlement was so strong during the early years of this century that it was officially moved north and clear of the favourable Pinnaroo District before it was settled in 1906.

Australian Landform Example No. 29

Abandoned Stream Channel

When natural stream channels change position on their floodplains previously active channels may become relict features. Such abandoned channel traces vary in form from cut-offs and scroll phenomena associated with more or less continuous lateral meander migration to separate reaches of channel perhaps several hundred kilometres long. The latter reflect wholesale channel abandonment and are due to tectonic activity, changes in hydrologic regime and levee crevassing, amongst other causes.

Abandoned channels are characteristic features of the Riverine Plain of southeastern Australia. On the extreme eastern margin of the Plain near The Rock, New South Wales, a number of particularly well-preserved abandoned channels exist in association with the floodplain of Burkes Creek. One such channel reach (Plate 1) can be traced through an axial distance of over seven kilometres and displays many features of unequivocally fluvial origin despite considerable modification by agricultural activity.

Meanders are conspicuous throughout the reach and many show a strong superficial resemblance to the sine generated curves described by Leopold and Langbein² (Figure 1). Accurate dumpy level survey revealed that the effect of meandering flow on cross-sectional shape can be detected in the abandoned channel. Section 1, across an inflexion zone, is relatively symmetrical (Figure 2). Section 2, across a meander bend (Figure